

N. Nashed
RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/367,013B

DATE: 03/05/2001
TIME: 10:52:15

Input Set : A:\ES.txt
Output Set: N:\CRF3\03052001\I367013B.raw

ENTERED

See p.5

3 <110> APPLICANT: DEBORAH, KNUTZON
 4 MUKERJI, PRADIP
 5 HUANG, YUNG-SHENG
 6 THURMOND, JENNIFER
 7 CHAUDHARY, SUNITA
 8 LEONARD, AMANDA
 10 <120> TITLE OF INVENTION: Methods and Compositions for Synthesis of Long Chain Polyunsaturated
 Fatty Acids
 13 <130> FILE REFERÉNCE: CGAB-210 USA
 15 <140> CURRENT APPLICATION NUMBER: US 09/367,013B
 C--> 16 <141> CURRENT FILING DATE: 1999-08-15
 18 <150> PRIOR APPLICATION NUMBER: US 08/834,655
 19 <151> PRIOR FILING DATE: 1997-04-11
 21 <160> NUMBER OF SEQ ID NOS: 40
 23 <170> SOFTWARE: PatentIn version 3.0
 25 <210> SEQ ID NO: 1
 26 <211> LENGTH: 1617
 27 <212> TYPE: DNA
 28 <213> ORGANISM: Mortierella alpina
 30 <220> FEATURE:
 31 <221> NAME/KEY: misc_feature
 32 <222> LOCATION: (...)
 33 <223> OTHER INFORMATION: Description of Combined DNA/RNA Molecule: Delta-6 Desaturase
 Nucleic Acid Sequence
 37 <400> SEQUENCE: 1
 38 cgacactcct tccttcttc caccgcctc agtccccctc aaccccccctc tttgacaaag 60
 40 acaacaacc atggctgctg ctcccaagtgt gaggacgttt actcggggccg aggttttgaa 120
 42 tgccgaggct ctgaatgagg gcaagaagga tgccgaggca cccttcttga tgatcatcg 180
 44 caacaagggtg tacgatgtcc gcgcaggatcg ccctgtatcat cccgggtggaa gtgtgattct 240
 46 cacgcacgtt ggcaaggacg gcactgacgt ctgtgacact ttccaccccg aggctgctt 300
 48 ggagactctt gccaactttt acgttgggtga tatttgacgag agcgaccgcg atatcaagaa 360
 50 ttagtactttt gcccggcggagg tccgcaagct gcttaccccttgc ttccagtttc ttgggttacta 420
 52 cgattttcc aaggcataact acgccttcaa ggtctcggtt aacccctgtca tctggggttt 480
 54 gtcgacggtc attgtggcca agtggggcca gacctcgacc ctgcaccaacg tgctctcg 540
 56 tgccgttttgc ggtctgttgc ggcagcactg cggatgggtt gctcacgact ttttgcac 600
 58 ccaggtttcc caggaccgtt tctgggggtga tctttccggc gccttcttgc gaggtgtctg 660
 60 ccagggtttcc tcgtccctcggtt ggtggaaaggca caagcacaac actcaccacg ccgcggccaa 720
 62 cgtccacggc gaggatcccg acattgacac ccacccctgtt ttgaccccttgc gtgagcatgc 780
 64 gttggagatg ttctcgatgtt tcccagatgtt ggagatgttcc cgcacatgttgc cgcgtttcat 840
 66 ggtctgttgc acagacccgtt tttacttccc catttctcg tttggcccttgc tctctgggt 900
 68 cctccatgttcc atttcttgc tgcgtccaa cggatggcc cacaaggccct cggggccgcgc 960
 70 tttggccatccatc tcgttgggtcg agcagatgttgc gcttgcgtt cactggacccgtt ggttaccccttgc 1020
 72 caccatgttcc tcgttcatca aggatccgtt caacatgttgc gtgtactttt tgggtgtcgca 1080
 74 ggcgtgtgc gaaaacttgtt tggcgatgtt gtttccatcg aaccacaacg gtatgcctgt 1140
 76 gatctcgaaag gaggaggcggtt tcgtatgttgc tttttccatcg aaggacatca tcacgggtcg 1200
 78 ttagtccac ccgggtcttat ttgccaactg gtttccatcg ggttacccgtt ggattgaact atcagatcg 1260
 80 gcaccacttgc ttcccttgc tgcctcgcca caactttca aagatccacg ctgtgtcg 1320

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82	gaccctgtgc	aaaaagtaca	atgtccgata	ccacaccacc	ggtatgatcg	agggactgc	1380
94	agaggtcttt	agccgtctga	acgaggctc	caaggctgcc	tccaaatgg	gtaaggcgca	1440
86	gtaaaaaaaaa	aaacaaggac	gttttttgc	gccagtgct	gtgcctgtc	ctgcctccct	1500
88	tgtcaagtgc	agcggttctg	gaaaggatcg	ttcagtgcag	tatcatcatt	ctccctttac	1560
90	cccccgctca	tatctcattc	atttcttta	ttaaacaact	tgttcccccc	ttcacccg	1617
93	<210>	SEQ ID NO:	2				
94	<211>	LENGTH:	457				
95	<212>	TYPE:	PRT				
96	<213>	ORGANISM:	Mortierella alpina				
98	<400>	SEQUENCE:	2				
100	Met Ala Ala Ala Pro Ser Val Arg Thr Phe Thr Arg Ala Glu Val Leu						
101	1	5	10	15			
103	Asn Ala Glu Ala Leu Asn Glu Gly Lys Lys Asp Ala Glu Ala Pro Phe						
104	20	25	30				
106	Leu Met Ile Ile Asp Asn Lys Val Tyr Asp Val Arg Glu Phe Val Pro						
107	35	40	45				
109	Asp His Pro Gly Gly Ser Val Ile Leu Thr His Val Gly Lys Asp Gly						
110	50	55	60				
112	Thr Asp Val Phe Asp Thr Phe His Pro Glu Ala Ala Trp Glu Thr Leu						
113	65	70	75	80			
115	Ala Asn Phe Tyr Val Gly Asp Ile Asp Glu Ser Asp Arg Asp Ile Lys						
116	85	90	95				
118	Asn Asp Asp Phe Ala Ala Glu Val Arg Lys Leu Arg Thr Leu Phe Gln						
119	100	105	110				
121	Ser Leu Gly Tyr Tyr Asp Ser Ser Lys Ala Tyr Tyr Ala Phe Lys Val						
122	115	120	125				
124	Ser Phe Asn Leu Cys Ile Trp Gly Leu Ser Thr Val Ile Val Ala Lys						
125	130	135	140				
127	Trp Gly Gln Thr Ser Thr Leu Ala Asn Val Leu Ser Ala Ala Leu Leu						
128	145	150	155	160			
130	Gly Leu Phe Trp Gln Gln Cys Gly Trp Leu Ala His Asp Phe Leu His						
131	165	170	175				
133	His Gln Val Phe Gln Asp Arg Phe Trp Gly Asp Leu Phe Gly Ala Phe						
134	180	185	190				
136	Leu Gly Gly Val Cys Gln Gly Phe Ser Ser Ser Trp Trp Lys Asp Lys						
137	195	200	205				
139	His Asn Thr His His Ala Ala Pro Asn Val His Gly Glu Asp Pro Asp						
140	210	215	220				
142	Ile Asp Thr His Pro Leu Leu Thr Trp Ser Glu His Ala Leu Glu Met						
143	225	230	235	240			
145	Phe Ser Asp Val Pro Asp Glu Glu Leu Thr Arg Met Trp Ser Arg Phe						
146	245	250	255				
148	Met Val Leu Asn Gln Thr Trp Phe Tyr Phe Pro Ile Leu Ser Phe Ala						
149	260	265	270				
151	Arg Leu Ser Trp Cys Leu Gln Ser Ile Leu Phe Val Leu Pro Asn Gly						
152	275	280	285				
154	Gln Ala His Lys Pro Ser Gly Ala Arg Val Pro Ile Ser Leu Val Glu						
155	290	295	300				
157	Gln Leu Ser Leu Ala Met His Trp Thr Trp Tyr Leu Ala Thr Met Phe						

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158	305	310	315	320
160	Leu Phe Ile Lys Asp Pro Val Asn Met Leu Val Tyr Phe Leu Val Ser			
161	325	330	335	
163	Gln Ala Val Cys Gly Asn Leu Leu Ala Ile Val Phe Ser Leu Asn His			
164	340	345	350	
166	Asn Gly Met Pro Val Ile Ser Lys Glu Glu Ala Val Asp Met Asp Phe			
167	355	360	365	
169	Phe Thr Lys Gln Ile Ile Thr Gly Arg Asp Val His Pro Gly Leu Phe			
170	370	375	380	
172	Ala Asn Trp Phe Thr Gly Gly Leu Asn Tyr Gln Ile Glu His His Leu			
173	385	390	395	400
175	Phe Pro Ser Met Pro Arg His Asn Phe Ser Lys Ile Gln Pro Ala Val			
176	405	410	415	
178	Glu Thr Leu Cys Lys Lys Tyr Asn Val Arg Tyr His Thr Thr Gly Met			
179	420	425	430	
181	Ile Glu Gly Thr Ala Glu Val Phe Ser Arg Leu Asn Glu Val Ser Lys			
182	435	440	445	
184	Ala Ala Ser Lys Met Gly Lys Ala Gln			
185	450	455		
187	<210> SEQ ID NO: 3			
188	<211> LENGTH: 1488			
189	<212> TYPE: DNA			
190	<213> ORGANISM: Mortierella alpina			
192	<400> SEQUENCE: 3			
193	gtccccctgtc gctgtcgca cacccatcc tccctcgctc cctctgcgtt tgcccttggc	60		
195	ccacccgtctc tcctccaccc tccgagacga ctgcaactgt aatcaggAAC cgacaaataac	120		
197	acgattttctt tttaactcagc accaactcaa aatcctcaac cgcaaccctt ttccaggatg	180		
199	gcacccctcca acactatcga tgccgtttg acccagcgctc atatcagcac ctccggcccca	240		
201	aactcggcca agcctgcctt cgaggcAAC taccaagctcc ccgagttcac catcaaggag	300		
203	atccgagagt gcatccctgc ccactgcTTT gagcgctccg gtctccgtgg tctctgccac	360		
205	gttgcatacg atctgacttg ggcgtcgctc ttgttccgtgg ctgcgaccca gatcgacaag	420		
207	tttggaaatc ccttgcattcc ctatggcc tggcctgttt actggatcat gcagggtatt	480		
209	gtctgcacccg gtgtctgggt gctggctcac gagtgtggc atcagtcctt ctgcacccctc	540		
211	aagaccctca acaacacagt tgggtggate ttgcactcga tgctctgggt cccttaccac	600		
213	tctggagaaa tctcgactc gaaggcaccac aaggccactg gccatatgac caaggaccag	660		
215	gtctttgtgc ccaagacccg ctcccagggtt ggcttgctc ccaaggagaa cgctgctgct	720		
217	gcgcgttcagg aggaggacat gtccgtgcac ctggatgagg aggctcccat tgtgactttg	780		
219	ttctggatgg tgatccagtt ctgttgcga tggcccgctg acctgattat gaacgcctct	840		
221	ggccaagact acggccgcgtg gacctcgacat ttccacacgt actcgcccat ctttgagccc	900		
223	cgcaactttt tcgacattat tatctcggac ctggatgtgt tggctccct cggtgcctg	960		
225	atctatgcct ccatgcagtt gtcgtcttg accgtcacca agtactatat tgcgtccctac	1020		
227	ctctttgtca acttttgggtt ggtccgtatc accttcttgc agcacaccga tcccaagctg	1080		
229	ccccattacc gcgagggtgc ctggaaatttc cagcgtggag ctctttgcac cggtgaccgc	1140		
231	tcgtttggca agttcttggaa ccataatgttc cacggcattt tccacaccca tggcccttgc	1200		
233	cacttgttct cgcaaatgc gttctaccat gctggagaaat ctacatataca tctcaagaaa	1260		
235	ctgtgtggag agtactatgt gtacgaccca tcccccgtcg tcgttgcgtt ctggaggtcg	1320		
237	ttccgtgagt gcccattcgatggaggatcgag ggagacgtgg tcttttcaa gaagtaaaaa	1380		
239	aaaagacaat ggaccacaca caaccctgtc tctacagacc tacgtatcat gtagccatac	1440		
241	cacttcataa aagaacatga gctctagagg cgtgtcatcc ggccttc	1488		

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Input Set : A:\ES.txt

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244 <210> SEQ ID NO: 4
 245 <211> LENGTH: 399
 246 <212> TYPE: PRT
 247 <213> ORGANISM: Mortierella alpina
 249 <400> SEQUENCE: 4

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252	1						5				10					15
254	Ser	Thr	Ser	Ala	Pro	Asn	Ser	Ala	Lys	Pro	Ala	Phe	Glu	Arg	Asn	Tyr
255							20				25					30
257	Gln	Leu	Pro	Glu	Phe	Thr	Ile	Lys	Glu	Ile	Arg	Glu	Cys	Ile	Pro	Ala
258							35				40					45
260	His	Cys	Phe	Glu	Arg	Ser	Gly	Leu	Arg	Gly	Leu	Cys	His	Val	Ala	Ile
261							50				55					60
263	Asp	Leu	Thr	Trp	Ala	Ser	Leu	Leu	Phe	Leu	Ala	Ala	Thr	Gln	Ile	Asp
264	65						70				75					80
266	Lys	Phe	Glu	Asn	Pro	Leu	Ile	Arg	Tyr	Leu	Ala	Trp	Pro	Val	Tyr	Trp
267							85				90					95
269	Ile	Met	Gln	Gly	Ile	Val	Cys	Thr	Gly	Val	Trp	Val	Leu	Ala	His	Glu
270							100				105					110
272	Cys	Gly	His	Gln	Ser	Phe	Ser	Thr	Ser	Lys	Thr	Leu	Asn	Asn	Thr	Val
273							115				120					125
275	Gly	Trp	Ile	Leu	His	Ser	Met	Leu	Leu	Val	Pro	Tyr	His	Ser	Trp	Arg
276							130				135					140
278	Ile	Ser	His	Ser	Lys	His	His	Lys	Ala	Thr	Gly	His	Met	Thr	Lys	Asp
279	145						145				150					160
281	Gln	Val	Phe	Val	Pro	Lys	Thr	Arg	Ser	Gln	Val	Gly	Leu	Pro	Pro	Lys
282							165				170					175
284	Glu	Asn	Ala	Ala	Ala	Ala	Val	Gln	Glu	Glu	Asp	Met	Ser	Val	His	Leu
285							180				185					190
287	Asp	Glu	Glu	Ala	Pro	Ile	Val	Thr	Leu	Phe	Trp	Met	Val	Ile	Gln	Phe
288							195				200					205
290	Leu	Phe	Gly	Trp	Pro	Ala	Tyr	Leu	Ile	Met	Asn	Ala	Ser	Gly	Gln	Asp
291							210				215					220
293	Tyr	Gly	Arg	Trp	Thr	Ser	His	Phe	His	Thr	Tyr	Ser	Pro	Ile	Phe	Glu
294	225						225				230					240
296	Pro	Arg	Asn	Phe	Phe	Asp	Ile	Ile	Ile	Ser	Asp	Leu	Gly	Val	Leu	Ala
297							245				250					255
299	Ala	Leu	Gly	Ala	Leu	Ile	Tyr	Ala	Ser	Met	Gln	Leu	Ser	Leu	Leu	Thr
300							260				265					270
302	Val	Thr	Lys	Tyr	Tyr	Ile	Val	Pro	Tyr	Leu	Phe	Val	Asn	Phe	Trp	Leu
303							275				280					285
305	Val	Leu	Ile	Thr	Phe	Leu	Gln	His	Thr	Asp	Pro	Lys	Leu	Pro	His	Tyr
306							290				295					300
308	Arg	Glu	Gly	Ala	Trp	Asn	Phe	Gln	Arg	Gly	Ala	Leu	Cys	Thr	Val	Asp
309	305						305				310					320
311	Arg	Ser	Phe	Gly	Lys	Phe	Leu	Asp	His	Met	Phe	His	Gly	Ile	Val	His
312							325				330					335
314	Thr	His	Val	Ala	His	His	Leu	Phe	Ser	Gln	Met	Pro	Phe	Tyr	His	Ala
315							340				345					350

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317 Glu Glu Ala Thr Tyr His Leu Lys Lys Leu Leu Gly Glu Tyr Tyr Val
 318 355 360 365
 320 Tyr Asp Pro Ser Pro Ile Val Val Ala Val Trp Arg Ser Phe Arg Glu
 321 370 375 380
 323 Cys Arg Phe Val Glu Asp Gln Gly Asp Val Val Phe Phe Lys Lys
 324 385 390 395
 326 <210> SEQ ID NO: 5
 327 <211> LENGTH: 355
 328 <212> TYPE: PRT
 329 <213> ORGANISM: Mortierella alpina
 331 <400> SEQUENCE: 5
 333 Glu Val Arg Lys Leu Arg Thr Leu Phe Gln Ser Leu Gly Tyr Tyr Asp
 334 1 5 10 15
 336 Ser Ser Lys Ala Tyr Tyr Ala Phe Lys Val Ser Phe Asn Leu Cys Ile
 337 20 25 30
 339 Trp Gly Leu Ser Thr Val Ile Val Ala Lys Trp Gly Gln Thr Ser Thr
 340 35 40 45
 342 Leu Ala Asn Val Leu Ser Ala Ala Leu Leu Gly Leu Phe Trp Gln Gln
 343 50 55 60
 345 Cys Gly Trp Leu Ala His Asp Phe Leu His His Gln Val Phe Gln Asp
 346 65 70 75 80
 348 Arg Phe Trp Gly Asp Leu Phe Gly Ala Phe Leu Gly Gly Val Cys Gln
 349 85 90 95
 351 Gly Phe Ser Ser Trp Trp Lys Asp Lys His Asn Thr His His Ala
 352 100 105 110
 354 Ala Pro Asn Val His Gly Glu Asp Pro Asp Ile Asp Thr His Pro Leu
 355 115 120 125
 357 Leu Thr Trp Ser Glu His Ala Leu Glu Met Phe Ser Asp Val Pro Asp
 358 130 135 140
 360 Glu Glu Leu Thr Arg Met Trp Ser Arg Phe Met Val Leu Asn Gln Thr
 361 145 150 155 160
 363 Trp Phe Tyr Phe Pro Ile Leu Ser Phe Ala Arg Leu Ser Trp Cys Leu
 364 165 170 175
 366 Gln Ser Ile Leu Phe Val Leu Pro Asn Gly Gln Ala His Lys Pro Ser
 367 180 185 190
 369 Gly Ala Arg Val Pro Ile Ser Leu Val Glu Gln Leu Ser Leu Ala Met
 370 195 200 205
 372 His Trp Thr Trp Tyr Leu Ala Thr Met Phe Leu Phe Ile Lys Asp Pro
 373 210 215 220
 375 Val Asn Met Leu Val Tyr Phe Leu Val Ser Gln Ala Val Cys Gly Asn
 376 225 230 235 240
 378 Leu Leu Ala Ile Val Phe Ser Leu Asn His Asn Gly Met Pro Val Ile
 379 245 250 255
 381 Ser Lys Glu Glu Ala Val Asp Met Asp Phe Phe Thr Lys Gln Ile Ile
 382 260 265 270
 384 Thr Gly Arg Asp Val His Pro Gly Leu Phe Ala Asn Trp Phe Thr Gly
 385 275 280 285
 387 Gly Leu Asn Tyr Gln Ile Glu His His Leu Phe Pro Ser Met Pro Arg
 388 290 295 300

Please Note:


 Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

VERIFICATION SUMMARY

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Input Set : A:\ES.txt

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L:16 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:418 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6
L:421 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6
L:424 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6
L:504 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8
L:507 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8
L:525 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:8
L:559 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:9
L:627 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:11
L:826 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:20
L:841 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:21
L:855 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:21
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L:1563 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:36
L:1624 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:37
L:1698 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:38
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L:1859 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:39
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